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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/593,974 | SAKAMOTO ET AL. | |
| | Examiner | Art Unit | |
| | RAHEL GUARINO | 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *31 January 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,7-11* is/are rejected.

7)☒ Claim(s) *3,5 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

**DETAILED ACTION**

1. This office action is in response to communication filed on 1/31/2011.

Claims 1-11 have been amended, claim 12 has been cancelled.

***Response to Arguments***

**Applicant arguments**

Independent claims 1-2, 7, and 10-11 have been amended to incorporate various recited features from claim 12, and claim 12 has been cancelled without prejudice or disclaimer. Specifically, cancelled claim 12 recited the feature "*...wherein either a fading pitch, moving speed of a mobile station, delay profile, or fluctuation period of receiving signal power is used as a parameter indicating the estimated speed of the change in the propagation path condition*," and independent claims 1-2, 7, and 10-11 have been amended to incorporate each of these parameters except the parameter of a *"moving speed of a mobile station."* Also, claims 1-11 have been amended to Clarify various recited feature.

That is, Ishii discloses a technique to select a channel to be used for estimating communication quality, based on a comparison between an elapsed time from when the mobile station last received user data and a predetermined time determined according

to a moving speed of the mobile station. In contrast, the Applicants' communication apparatus recited by claim 1 uses" *one of a fading pitch, delay profile, or fluctuation period of receiving signal power"* parameter indicating the estimated speed of the change in the propagation path condition." Ishii does not disclose using any of these recited parameters, and in the rejection of claim 12, the Office Action does not allege that Ishii discloses using any of these recited parameters (see OA, pg, 3, third line from the bottom, to page 4, line 2, and pg. 7, lines 12-16). It is noted that the Office Action does not cite Takano '015 or Takano '752 for supplementing the teachings of Ishii in this regard.

**Examiner's answer**

Examiner agrees. However, Ishii taught "*moving speed of a mobile station as a parameter indicating the estimated speed of the change in the propagation path condition* "which was removed from the claim 12.

Newly cited reference Nakamura (US 7,062,287) discloses a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Applicant's arguments with respect to claims have been considered but are moot in view of the new grounds of rejection.

2. The indicated allowability of claim 4 is withdrawn in view of the newly discovered reference(s) to in view of Heath et al. US 2002/0136287

Rejections based on the newly cited reference follow.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 cites *"the propagation path estimation section divides the received signal into predetermined data sizes, detects fluctuation in reception quality on a basis of divided data, and thereby estimates the speed of the change in the propagation path condition"*.

If the propagation path estimation estimates speed of change in a propagation path condition, it is unclear how *the propagation path estimation divides the received*

*signal into predetermined data sizes, detects fluctuation in reception quality on a basis of divided data?*

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Ishii et al. US 7,363,057 in view of Nakamura et al. US 7,062,287**

Re claim 1, Ishii discloses a communication apparatus comprising (fig.2):

a propagation path condition estimation section that estimates speed of a change (*based on the moving speed of the mobile station for a predetermined time; see fig.6 and col. 9 lines 14-30)* in a propagation path condition (*col. 7 lines 51-60)*;

a communication quality estimation section *(quality estimation section; 27)* that changes a method of estimating the communication quality of a received signal *(col. 7 lines* 51-56), based on the estimated speed of the change in the propagation path condition (*fig.4 shows the quality estimation section; col. 8 lines 8-45. The received signal is delayed (delay devices) depending on the path timing (for ex: predetermined*

*time of the moving speed of the mobile station) and inputted into the despreaders 272-1 to 272-k (where K=numbers of multipaths)* and estimates the communication quality *(col. 8 lines 1-8)*;

a transmission section *(Tx;29)* that transmits the estimated communication quality estimated to a communicating party *(base station)( the estimated quality signal is combined with signal combining section (280 and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)* ;

a reception section *(Rx;23)* that receives data modulated in a modulation scheme determined by the communicating party based on the communication quality *(base statio*n; *the base station (fig.5) determines modulation and coding (17) based on the received signal (quality information) from the mobile station. The base station transmits (19) the resulting transmission information to the mobile station; col. 8 lines 59 to col. 9 lines 8 and col. 9 lines 40-45);* and a demodulation section that demodulates the data *(col. 7 lines 60-64);* does not teach wherein one of a fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition.

However, Nakamura discloses wherein one of a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a

parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Therefore, taking the combined teaching of Ishii and Nakamura as a whole would have been rendered obvious to one skilled in the art to modify Ishii to utilize Nakamura's fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition for the benefit of obtaining the desired BER with a higher degree precision in a highly mobile environment.

**7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Ishii et al. US 7,363,057 in view of Heath et al. US 2002/0136287**

Re claim 4, Ishii discloses a communication apparatus comprising (fig.2):

a propagation path condition estimation section that estimates speed of a change (*based on the moving speed of the mobile station for a predetermined time; see fig.6 and col. 9 lines 14-30)* in a propagation path condition (*col. 7 lines 51-60)*;

a communication quality estimation section *(quality estimation section; 27)* that changes a method of estimating the communication quality of a received signal *(col. 7 lines* 51-56), based on the estimated speed of the change in the propagation path condition (*fig.4 shows the quality estimation section; col. 8 lines 8-45. The received signal is delayed (delay devices) depending on the path timing (for ex: predetermined*

*time of the moving speed of the mobile station) and inputted into the despreaders 272-1 to 272-k (where K=numbers of multipaths)* and estimates the communication quality *(col. 8 lines 1-8)*;

a transmission section *(Tx;29)* that transmits the estimated communication quality estimated to a communicating party *(base station)( the estimated quality signal is combined with signal combining section (280 and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)* ;

a reception section *(Rx;23)* that receives data modulated in a modulation scheme determined by the communicating party based on the communication quality *(base stati*on; *the base station (fig.5) determines modulation and coding (17) based on the received signal (quality information) from the mobile station. The base station transmits (19) the resulting transmission information to the mobile station; col. 8 lines 59 to col. 9 lines 8 and col. 9 lines 40-45);* and a demodulation section that demodulates the data *(col. 7 lines 60-64);* does not teach wherein the communication quality estimation section estimates the communication quality by a plurality of estimation methods, and selects the communication quality estimated by one of the plurality of estimation methods based on the speed of the change in the propagation path condition.

However, Heath discloses wherein the communication quality estimation section (525) estimates the communication quality by a plurality of estimation methods (*para#39 and 46)* and selects the communication quality estimated by one of the plurality of estimation methods (para#41) based on the speed of the change in the propagation path condition.

Therefore, taking the combined teaching of Ishii and Heath as a whole would have been rendered obvious to one skilled in the art to modify Ishii to further incorporate Heath's quality estimation section estimates the communication quality by a plurality of estimation methods, and selects the communication quality estimated by one of the plurality of estimation methods based on the speed of the change in the propagation path condition for the benefit of adjusting the system setting in order to attain optimal link quality (para#67).

**8. Claims 2,7,8,10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii et al. US 7,363,057 in view of Takano et al. US 6,985,752 in further view of Nakamura et al. US 7,062,287**

Re claim 2, Ishii discloses a communication apparatus comprising (fig.3):

a propagation path condition estimation section *(communication path estimation section;25)* that estimates a speed of a change (*based on the moving speed of the mobile station for a predetermined time; see fig.6 and col. 9 lines 14-30)* in a propagation path condition (*col. 7 lines 51-60)*;

a communication quality estimation section *(quality estimation section; 27)* that changes a method of estimating a communication quality of a received signal *(col. 7*

*lines 64 to col. 8 lines 3)*, based on the estimated speed of the change in the propagation path condition, (*fig.4 shows the quality estimation section; col. 8 lines 8-45. The received signal is delayed (delay devices) depending on the path timing (for ex: predetermined time of the moving speed of the mobile station) and inputted into the despreaders 272-1 to 272-k (where K=numbers of multipaths)* and estimates the communication quality *(col. 8 lines 1-8)*; does not teach a threshold setting section that sets a criterion for selecting, from a plurality of modulation schemes, select a modulation scheme for use in communication with a communicating party based on estimated of the speed of the change in the propagation path condition*;* a modulation scheme selection section that selects the modulation scheme from the estimated communication quality and the criterion; and a transmission section that transmits information of the selected modulation scheme to the communicating party.

In the same field of endeavor, however, Takano discloses a threshold setting section *(15c)* that sets a criterion *(col. 10 lines 48-57)* for selecting, from a plurality of modulation schemes (*64 QAM, 16QAM, QPSK)* select a modulation scheme *(modulation-coding mode selection; 15)* for use in communication with a communicating party based on estimated of the speed of the change in the propagation path condition *(col. 9 lines 11-18);* a modulation scheme selection (*modulation and coding unit (17))* section that selects the modulation scheme from the estimated communication quality and the criterion *(col. 8 lines 63 to col. 9 lines 1-18)*; and a transmission section *(19)* that transmits information of the selected modulation scheme to the communicating party *(col. 9.* lines *19-26).*

The modified invention of Ishii and Takano does not teach wherein one of a fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition.

However, Nakamura discloses wherein one of a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Therefore, taking the combined teaching of Ishii and Takano as a whole would have been rendered obvious to one skilled in the art to modify Ishii to implement Takano's threshold setting section that sets a criterion to select a modulation scheme for use in communication with a communicating party from a plurality of modulation schemes based on information of the speed of the change in the propagation path condition; a modulation scheme selection section that selects a modulation scheme from the communication quality by the criterion set by the threshold setting section for the benefit of selecting modulation and coding mode at an optimal transmission rate (col.5 lines 1-5, Takano).

Therefore, taking the combined teaching of Ishii, Takano and Nakamura as a whole would have been rendered obvious to one skilled in the art to modify the combined invention of Ishii and Takano to further incorporate Nakamura's fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition for the benefit of obtaining the desired BER with a higher degree precision in a highly mobile environment.

Re claim 7, Ishii discloses a communication apparatus comprising (fig.3):

a reception section *(Rx;15)* that receives information of a speed of a change in a propagation path condition(*col. 7 lines 51-60)*, the speed of the change in the propagation path condition estimated by a communicating party *(the estimated quality signal is combined with signal combining section (280 and is transmitted using transmitter (29) to the base station receiver ; col. 8 lines 45-51)*; does not explicitly teach a threshold setting section that sets a criterion for selecting, from a plurality of modulation schemes, select a modulation scheme for use in communication with a communicating party based on estimated of the speed of the change in the propagation path condition; a modulation scheme selection section that selects the modulation scheme from the estimated communication quality and the criterion; and a transmission section that transmits the modulated data by a radio signal.

In the same field of endeavor, however, Takano discloses a threshold setting section *(15c)* that sets a criterion *(col. 10 lines 48-57)* for selecting, from a plurality of modulation schemes (*64 QAM, 16QAM, QPSK),* a modulation scheme *(modulation-*

*coding mode; 15)* of a signal to be transmitted to the communicating party based on information of the speed of the change in the propagation path condition *(col. 9 lines 11-18);* a modulation scheme selection (*modulation and coding unit (15))* section that selects the modulation scheme based on the criterion *(col. 9 lines 9-18)* and reception quality of a signal received by communicating party *(col. 8 lines 63 to col. 9 lines 1-10)* ; and an adaptive modulation section *(17)* that modulates data in the selected modulation scheme *(col. 8 lines 63 to col. 9 lines 1-10);* and a transmission section *(19)* that transmits the modulated data by a radio signal *(col. 9. lines 19-26).*

The modified invention of Ishii and Takano does not teach wherein one of a fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition.

However, Nakamura discloses wherein one of a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Therefore, taking the combined teaching of Ishii and Takano as a whole would have been rendered obvious to one skilled in the art to modify Ishii to implement

Takano's threshold setting section that sets a criterion to select a modulation scheme for use in communication with a communicating party from a plurality of modulation schemes based on information of the speed of the change in the propagation path condition; a modulation scheme selection section that selects a modulation scheme from the communication quality by the criterion set by the threshold setting section for the benefit of selecting modulation and coding mode at an optimal transmission rate (col.5 lines 1-5, Takano).

Therefore, taking the combined teaching of Ishii, Takano and Nakamura as a whole would have been rendered obvious to one skilled in the art to modify the combined invention of Ishii and Takano to further incorporate Nakamura's fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition for the benefit of obtaining the desired BER with a higher degree precision in a highly mobile environment.

Re claim 8, the modified invention as claimed in claim 2, wherein the threshold setting section *(15c)* sets the criterion so that a first threshold for switching the modulation scheme is higher when a first estimated speed of the change in the propagation path condition is fast than in a threshold than the a second threshold for switching the modulation scheme when a second estimated speed of the change in the propagation path condition is slow (*col.10 lines 43-col. 11 lines 1-18, Takano; figure 5 shows the selection of modulation according to the speed. For ex: for high speed*

*MCS#3 is selected and for slow speed MCS1 is selected and col. 4 lines 5-12, Takano*).

Re claim 10, Ishii discloses a communication method comprising (fig.3):

Estimating *(communication path estimation section; 25)* that estimates a speed of a change (*based on the moving speed of the mobile station for a predetermined time; see fig.6 and col. 9 lines 14-30)* in a propagation path condition (*col. 7 lines 51-60)*;

changing *(channel selection; 24)* a method of estimating communication quality of a received signal, based on the speed of the change in the propagation path condition *(col. 7 lines 64 to col. 8 lines 3)*, to estimate communication quality *(quality estimation section; 27;col. 8 lines 4-8 and fig.4 shows the structure of the quality estimation section)*, and transmitting *(Tx;29)* information of the estimated communication quality and information of the estimated speed of the change in the propagation path condition to a transmitting side *(the estimated quality signal is combined with signal combining section (280) and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)*; receiving the information of the estimated communication quality and the information of the estimated speed of the change in the propagation path condition, both transmitted from the receiving side *(the estimated quality signal is combined with signal combining section (280) and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)*, does not teach a threshold setting section that sets a criterion for selecting, from a plurality of modulation schemes, select a modulation scheme for use in communication with a communicating party based on estimated of the speed of the change in the propagation path condition; a modulation scheme selection section that selects the modulation scheme from the

estimated communication quality and the criterion; and a transmission section that transmits the modulated data by a radio signal; receiving the modulated data transmitted from the transmitting side; demodulating the received modulated data.

In the same field of endeavor, however, Takano discloses a threshold setting section *(15c)* that sets a criterion *(col. 10 lines 48-57)* for selecting, from a plurality of modulation schemes (*64 QAM, 16QAM, QPSK);* a modulation scheme *(modulation-coding mode selection; 15*) of a signal to be transmitted to the receiving side *(col. 11 lines 7-18),* based on the received information of the estimated speed of the change in the propagation path condition *(col. 9 lines 11-18);*selecting (*15a)* the modulation scheme based on the set criterion and the received information of the estimated speed communication quality of a signal *(col. 10 lines 32-39)*; modulating (*17)* data the selected modulation scheme *(col. 8 lines 63 to col. 9 lines 1-18)*; a transmission section *(19)* the modulated data by a radio signal *(col. 9. lines 19-26);*receiving *(23)* the modulated data transmitted from the transmitting side *(19);* demodulating *(26)* the received modulated data *(col. 9 lines 63-67).*

The modified invention of Ishii and Takano does not teach wherein one of a fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition.

However, Nakamura discloses wherein one of a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates*

*delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Therefore, taking the combined teaching of Ishii and Takano as a whole would have been rendered obvious to one skilled in the art to modify Ishii to implement Takano's threshold setting section that sets a criterion to select a modulation scheme for use in communication with a communicating party from a plurality of modulation schemes based on information of the speed of the change in the propagation path condition; a modulation scheme selection section that selects a modulation scheme from the communication quality by the criterion set by the threshold setting section for the benefit of selecting modulation and coding mode at an optimal transmission rate (col.5 lines 1-5, Takano).

Therefore, taking the combined teaching of Ishii, Takano and Nakamura as a whole would have been rendered obvious to one skilled in the art to modify the combined invention of Ishii and Takano to further incorporate Nakamura's fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition for the benefit of obtaining the desired BER with a higher degree precision in a highly mobile environment.

Re claim 11, Ishii discloses a communication method comprising (fig.3):

Estimating *(communication path estimation section; 25)* that estimates a speed of a change (*based on the moving speed of the mobile station for a predetermined time; see fig.6 and col. 9 lines 14-30)* in a propagation path condition (*col. 7 lines 51-60)*;

changing *(channel selection; 24)* a method of estimating communication quality of a received signal, based on the speed of the change in the propagation path condition *(col. 7 lines 64 to col. 8 lines 3)*, to estimate communication quality *(quality estimation section; 27;col. 8 lines 4-8 and fig.4 shows the structure of the quality estimation section)*, and transmitting *(Tx;29)* information of the estimated communication quality and information of the estimated speed of the change in the propagation path condition to a transmitting side *(the estimated quality signal is combined with signal combining section (280) and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)*; receiving the information of the estimated communication quality and the information of the estimated speed of the change in the propagation path condition, both transmitted from the receiving side *(the estimated quality signal is combined with signal combining section (280) and is transmitted using transmitter (29) to the base station; col. 8 lines 45-51)*, does not teach a threshold setting section that sets a criterion for selecting, from a plurality of modulation schemes, select a modulation scheme for use in communication with a communicating party based on estimated of the speed of the change in the propagation path condition; a modulation scheme selection section that selects the modulation scheme from the estimated communication quality and the criterion; and a transmission section that transmits the modulated data by a radio signal; receiving the modulated data.

In the same field of endeavor, however, Takano discloses a threshold setting section *(15c)* that sets a criterion *(col. 10 lines 48-57)* for selecting, from a plurality of modulation schemes (*64 QAM, 16QAM, QPSK);* a modulation scheme *(modulation-coding mode selection; 15*) of a signal to be transmitted to the receiving side *(col. 11 lines 7-18),* based on the received information of the estimated speed of the change in the propagation path condition *(col. 9 lines 11-18);*selecting (*15a)* the modulation scheme based on the set criterion and the received information of the estimated speed communication quality of a signal *(col. 10 lines 32-39)*; modulating (*17)* data the selected modulation scheme *(col. 8 lines 63 to col. 9 lines 1-18)*; transmitting *(19)* the modulated data by a radio signal *(col. 9. lines 19-26);*receiving *(23)* the modulated data transmitted from the transmitting side *(19);* demodulating *(26)* the received modulated data *(col. 9 lines 63-67).*

The modified invention of Ishii and Takano does not teach wherein one of a fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition.

However, Nakamura discloses wherein one of a fading pitch (*203; col. 12 lines 4-15*), delay profile (*221 and fig.9;the path level difference detects the reception level (received signal intensity) differences between paths of the multipaths, generates delay profile using autocorrelation and detects multipath based on the peak level of delay profile; col. 13 lines 23-55)* and fluctuation period of receiving signal power (*205 and fig.3 shows the received power SIR fluctuation;col.10 lines 10-35*) is used as a

parameter indicating the estimated speed of the change in the propagation path condition (*col. 4 lines 20-31).*

Therefore, taking the combined teaching of Ishii and Takano as a whole would have been rendered obvious to one skilled in the art to modify Ishii to implement Takano's threshold setting section that sets a criterion to select a modulation scheme for use in communication with a communicating party from a plurality of modulation schemes based on information of the speed of the change in the propagation path condition; a modulation scheme selection section that selects a modulation scheme from the communication quality by the criterion set by the threshold setting section for the benefit of selecting modulation and coding mode at an optimal transmission rate (col.5 lines 1-5, Takano).

Therefore, taking the combined teaching of Ishii, Takano and Nakamura as a whole would have been rendered obvious to one skilled in the art to modify the combined invention of Ishii and Takano to further incorporate Nakamura's fading pitch, delay profile and fluctuation period of receiving signal is used as a parameter indicating the estimated speed of the change in the propagation path condition for the benefit of obtaining the desired BER with a higher degree precision in a highly mobile environment.

***Allowable Subject Matter***

9. Claims 3, 5, 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. Claim 9 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to show the state of the art with respect to fading pitch, delay profile and fluctuation period of receiving signal power is used as a parameter indicating the estimated speed of the change in the propagation path condition.

Takiishi et al. (US 7,650,261) discloses an apparatus for calculating propagation paths fluctuation generated by a speed object, wherein the propagation path parameters (*col. 6 lines 31 to col. 7 lines 10*) are amongst other things power level characteristics (*col. 14 lines 7-66 and col. 15 lines 46-55*), time delay characteristics (*col. 10 lines 37-54*), and arrival direction characteristics (*equation 1; col. 8 lines 31-47*). Fig.1 shows the time delay profile with respect of the received power (*col. 1 line 24-44*).

Fig.2 shows the time delay and received power of a propagation path is changing with the movement of the mobile station.

Ogino (US 6,813,309) discloses method and apparatus for determining fading pitch *(fig.8; col. 9 lines 65 to col. 10 lines 5 and equation 1 is used for calculating the fading pitch; col. 10 lines 62 to col. 11 lines 29)*, delay profile (*col. 9 lines 52-58*) and fluctuation period of receiving signal (*112; received electrical field intensity*; *col. 8 lines 41-44 and col. 13 lines 46-49*) is used as a parameter indicating the estimated speed of the change in the propagation path condition (*col.10 lines 9-44*) .

Ogino provides an example (col. *12 lines 15-52*) for fading pitch, delay profile and fluctuation period of receiving signal power.

"*If the speed of movement of the mobile terminal is assumed to be 60 km/h (16.7 m/s), equation (1) gives a fading pitch of 9 msec (a fading frequency of 111.1 Hz). In other words, the received electric field intensity rises and falls at a period of 9 msec, as shown in the figure. Further, the lines labeled A, B. . . G in the figure show the time ranges of executing a process of calculating power by multiplying received waves in 10-msec units with the PN code. Since an integrating process accompanies the peak search, the time the calculation continues is on the order of milliseconds. A, B, . . . , G correspond to the different peak positions in the delay profile, each being shifted from the others within a range of approximately.+-30 μsec*".

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rahel Guarino whose telephone number is (571)270-1198. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Payne David can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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